exposed to treatment in the furnace. Their further control will be determined by the influences which the character of the furnace structure exercises on the composition of the slag.

1. SILICON.

According to the equation Si+20=Si02, 1 per cent. Si requires for its oxidation 114 per cent. 0 resulting in the formation of 2*14 per cent. SiOs - . . (32).

In the open-hearth furnace, however, the requisite oxygen can only be derived from iron oxides, the decomposition of which, as already mentioned on p. 140, takes place according to the formula

The resultant iron silicate is liquid and much lighter than metallic iron ; therefore, on formation it floats to the slag. On formation of this iron silicate, the ferrous oxide contained in it has become inactive on the reducing agents. In acid open-hearth furnaces it is, therefore, cut off from further reaction* It is, however, in contact with the furnace structure and is capable of taking up silica therefrom, up to tho maximum content, which is attained at about 59 per cent.1 In acid Bessemer converters, where the conditions are similar, the SiOa content of the slag rises to as much as 69 per cent., according to H. H. Campbell.

With increased silica content, the degree of fluidity of tho slag varies ; it becomes always thicker, in spite of riso of temperature. If the latter be high enough a new phenomenon makes its appearance, which is always observed in crucible steel manufacture, and at times in acid opon-hearth furnaces. The carbon has become able to remove the free silica from the slag, and reduce it to silicon, which is dissolved by the metal. The reaction occurs according to the formula

1 The translator docs not agree at all with this view ; he regards iho inereaai'd silica content in the slag due to greater reductibility of Ke.O in the Hlag the higher the temperature, afi one of several causes of the higher Si()3 percentage.

a This is certainly not the case; even at 1,000° above steel -making heals it does not occur, and were the statement given true, ordinary plumbago e.rmubles would be self -smelting. The action is largely due to catalysis, iron being essential to the reaction taking place, — (Translator.)